Supplementary Online Content

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eMethods. Analysis of Variables and Inclusion and Exclusion Criteria

eTable 1. AOR for All Variables in the Final Model to Examine the Association Between ICU Beds and Mechanical Ventilation

eTable 2. Characterizations of Hospitals Included and Excluded in the Analyses

eTable 3. 2004-2005 Hospitals Included and Excluded

eTable 4. 2000-2001 Hospitals Included and Excluded

eTable 5. 2012-2013 Hospitals Included and Excluded

This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods. Analysis of Variables and Inclusion and Exclusion Criteria

In this supplement, we provide the adjusted odds ratio (AOR) for all variables in the final model to examine the association between ICU beds and mechanical ventilation (eTable 1).

Characterizations of Hospitals included and not included in the analyses (eTable 2)

There are two main exclusions that impact hospital admissions and hospitals studied. First, we required there to be information on number of ICU beds from the AHA. Second, we required that each hospital had at least 5 admissions per year. In the years studied, there was total of 744, 347 hospital admissions. A total of 109,165 hospitalizations were excluded (14.7%). The majority of the hospitalizations that were excluded were excluded because of missing data on number of ICU beds and ICU step down beds (n= 97,274), being in a hospital that did not meet the threshold of 5 hospitalizations for eligible patients (n= 1956), and finally, 9,935 hospitalizations were excluded because that patient was admitted to a hospital that had less than 5 hospitalizations in that year.

The second concern is which hospitals were not included in the analyses. There are four reasons that hospitals were excluded: 1) the hospital did not meet the threshold of 5 admissions for eligible patients; 2) the hospital did not submit information on ICU beds; and 3) the hospital did not participate in AHA survey. We estimate the potential denominator using both Medicare Claims or AHA data. With the AHA data, we applied the following inclusion criteria: 1) medical/surgical hospital (ie, excluding hospitals that are pediatric, psychiatric, long term hospital); 2) hospital reported Medicare admissions; and 3) hospital did not close in that year. In 2005, we found that there was 4882 hospitals based on AHA or Medicare Claims. Of these hospitals, 97 did not match to AHA data, 568 hospitals were missing data on AHA data, and 662 hospitals did not meet the cut off of 5 hospital admissions. We focused on hospitals excluded on the basis of missing ICU bed data and too few admissions.

As expected, our inclusion criteria were more likely to exclude smaller hospitals, those that were government owned, and critical access hospitals (eTables 3-5).

eTable 1. AOR for All Variables in the Final Model to Examine the Association Between ICU Beds and Mechanical Ventilation

Variable	AOR	95% CI
Gender (reference male)	0.77	0.75-0.79
Diagnosis		
CHF	1.24	1.20-1.27
Cardiac	0.98	
Cancer	0.97	0.97-1.02
History of Hip fracture	0.87	0.82-0.93
History of pneumonia	1.47	1.42-1.51
Schizophrenia	1.25	1.18-1.33
Bipolar disease	1.14	1.05-1.24
Diabetes	1.15	1.12-1.18
Aphasia	1.04	1.00-1.07
Stroke	0.99	0.96-1.02
Hemiplegia	0.94	0.90 -0.98
Parkinson's disease	0.96	0.93-1.00
COPD/Emphysema	1.55	1.50-1.59
ESRD	1.10	1.06-1.15
Traumatic Brain Injury	1.17	1.00-1.37
Paraplegia	1.07	0.86-1.33
ADL = 4	Reference	
ADL = 5	1.12	1.02-1.23
ADL = 6	1.14	1.05-.124
ADL = 7	1.28	1.18-1.39
CPS = 5	Reference	
CPS = 6	1.54	1.49-1.59
Race		
White	Reference	
Black	1.24	1.20-1.28
Hispanic	1.65	1.1
Age	0.98	0.973--.977
Time from MDS to Hospitalization (per day)	0.99	0.998-0.999
Transferred from NH	1.14	1.11-1.18
Prior Hospitalization	1.29	1.26-1.32

ICU Beds per 10 increase	1.06	1.05-1.07
ICU Stepdown beds per 10 increase	1.01	1.004-1.014

eTable 2. Characterizations of Hospitals Included and Excluded in the Analyses

Characteristic	Hospitalization Included (n=634,182)	Hospitalization Excluded (n=109,165)
Age (mean, SD, IQR)	84.2 (7.5, 79,90)	84.0 (7.4, 79, 89) (P<.01)
Sex (% female)	30.9	30.5 (P=.02)
Race (%)		
White	72.5	69.7 (P<.01)
Black	22.3	22.6
Hispanic	2.8	4.1
Mechanical Ventilation (%)	6.3	5.2 (P<.01)
CPS score is 6	62.2	65.0 (P<.01)
ADL dependency is 7	73.2	75.7 (P≤.01)

eTable 3. 2004-2005 Hospitals Included and Excluded

Hospital Characteristics	2004-2005 Hospital Included (N=2882)	2004-2005 Hospital Excluded (N= 1903)	2004-2005 Hospital Excluded on no admissions, *P* value
Tax Status (%)			
Government	20.3	36.3	<.001
Church owned	13.3	7.4	
Not-for-Profit	52.4	40.9	
For-Profit	14.1	16.2	
Number of Beds (mean, sd, IQR)	108.1 (104,35,148)	32.7 (37.8, 14, 34)	<.001
Total Admissions (mean, sd, IQR)	9709.0 (9911, 2488, 13919)	3813.5 (5516, 611, 4659)	<.001
JACHO Accredited (% yes)	77.1	48.4	<.001
Medical School Affilation (% yes)	28.9	18.6	<.001
Critical Access Hospital (% yes)	13.3	43.8	<.001

eTable 4. 2000-2001 Hospitals Included and Excluded

Hospital Characteristics	2000-2001 Hospital Included (N=3076)	2000-2001 Hospital Excluded (N= 1532)	P value
Tax Status (%)			
Government	21.8	32.6	<.001
Church owned	13.0	9.0	
Not-for-Profit	51.8	43.4	
For-Profit	13.4	15.1	
Number of Beds (mean, sd, IQR)	102.4 (94,38,132)	39.1 (74.2, 15, 36)	<.001
Total Admissions (mean, sd, IQR)	8332.0 (8639, 2174, 11557)	3710 (5727, 1192, 10685)	<.001
JACHO Accredited (% yes)	85.6	56.3	<.001
Medical School Affilation (% yes)	20.7	11.3	<.001
Critical Access Hospital ** (% yes)			

** Data not available in 2000.

eTable 5. 2012-2013 Hospitals Included and Excluded

Hospital Characteristics	2012-2013 Hospital Included (N=2447)	2001-2002 Hospital Excluded (N= 1466)	P value
Tax Status (%)			
Government	17.3	26.5	<.001
Church owned	9.7	12.7	
Not-for-Profit	55.0	44.4	
For-Profit	15.1	19.4	
Number of Beds (mean, sd, IQR)	128.7 (120, 42,177)	36.3 (42.7, 17, 35)	<.001
Total Admissions (mean, sd, IQR)	10,821.8 (11,177, 2802, 15381)	3637.8 (5151, 600, 4483)	<.001
JACHO Accredited (% yes)	78.8	52.3	<.001
Medical School Affilation (% yes)	34.3	16.6	<.001
Critical Access Hospital ** (% yes)	10.6	44.3	<.001